

REMARKS

Claims 1, 3 – 15 and 17 – 20 are presented for reconsideration and further examination in view of the following remarks.

In the outstanding Office Action, the Examiner: objected to claims 4, 5, 14 and 17 for informalities; rejected claims 4 and 13 under 35 U.S.C. 112, second paragraph, as indefinite; rejected claims 1 – 20 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,180,320 to Saito et al. (hereinafter referred to as “Saito”); and further rejected claims 14 – 20 under 35 U.S.C. 103(a) as being unpatentable over Saito in view of U.S. Patent No. 6,673,525 to Wheeler et al. (hereinafter referred to as “Wheeler.”)

By this Response and Amendment, claims 2 and 16 are cancelled without prejudice or disclaimer, claims 1, 3 – 5, 7, 13, 14, 17, and 18 are amended, the Examiner’s objections are obviated, and the Examiner’s rejections are traversed.

It is respectfully submitted that the above amendments introduce no new matter within the meaning of 35 U.S.C. §132. Support for the amendments to claims 1 and 14 may be found in original claims 2 and 16, now cancelled, and in the specification as filed, including *inter alia* page 5 lines 12 – 19 (“a chemical reaction layer is formed within the photoresist region”), page 6 line 17 – page 7 line 18 (“photoresist layer 105 is exposed to form...a second photoresist region, including a first chemical material”), and page 8 line 21 – page 9 line 13 (“the second chemical material within the chemical diffusion layer 120 is diffused into the nonirradiated region 110 in a baking process 130”). The remaining amendments are made only to correct informalities and dependencies, and to bring the remaining claims into conformance with amended independent claims 1 and 14.

Objections to the Claims

The above amendments, suggested by the Examiner in the outstanding office action, obviate the

Examiner's objections to claims 4, 5, 14, and 17.

Rejections under 35 U.S.C. §112, second paragraph

In the outstanding Office Action, the Examiner rejected claims 4 and 13 under 35 U.S.C. 112, second paragraph, as being indefinite.

Regarding claim 4, Applicants have amended the claim in the manner suggested by the Examiner, and submit that the now-recited feature of "a fluorine-*based* acid" is sufficiently definite to overcome the Examiner's rejection.

Regarding claim 13, Applicants have amended the claim, and submit that the now-recited feature that "the temperature...*is* about 50 degrees centigrade to 200 degrees centigrade" is sufficiently definite to overcome the Examiner's rejection.

Accordingly, reconsideration and withdrawal of all rejections under 35 U.S.C. 112, second paragraph, are requested.

Rejections under 35 U.S.C. §102(b)

In the outstanding Office Action, the Examiner rejected claims 1 – 20 as being anticipated by Saito.

Response

Reconsideration and withdrawal of the rejections are requested.

For a reference to anticipate an invention, all of the elements of that invention must be present in the reference. The test for anticipation under section 102 is whether each and every element as set forth in the claim is found, either expressly or inherently, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP §2131. The identical

invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP §2131.

By this Response and Amendment, Applicants respectfully traverse the Examiner's rejection since the cited prior art does not disclose, teach or suggest all of the features of independent claims 1 and 14, and thus of claims 3 – 13, and of claims 15 and 17 – 20, dependent respectively therefrom.

Claims 1 and 14 have been amended, and now recite methods for shrinking the image of photoresist comprising *inter alia* the steps of exposing a photoresist layer to form first and second photoresist regions "wherein a first chemical material is produced within said second photoresist region," baking a chemical diffusion layer and the first and second photoresist regions "wherein said first chemical material is diffused into said first photoresist region to react with the material of said first photoresist region for forming a chemical reaction layer within said first photoresist region," and developing the chemical diffusion layer and the first and second photoresist regions to "remove said chemical reaction layer and said second photoresist region."

Saito discloses a method of stably manufacturing a fine resist pattern narrower than the wavelength of exposing light from a stepper. Under the method, a resist pattern is formed on a semiconductor substrate through use of an acid catalyst chemically-amplified photoresist, and an organic film which includes an acid or which produces an acid on exposure to light is formed on the surface of the semiconductor substrate including the resist pattern. The organic film is then subjected to a heat treatment to thereby diffuse an acid. The surface layer of the resist pattern is made soluble in an alkaline developer, and the surface layer of the resist pattern is removed through use of the alkaline developer. As a result, a fine resist pattern is formed.

Saito fails to anticipate the presently claimed invention, as Saito does not disclose, teach, or suggest that a first chemical material is produced within the second photoresist region of the photoresist

layer during the exposing process.

Saito further fails to anticipate the presently claimed invention, as Saito does not disclose, teach, or suggest that a first chemical material is diffused into a first photoresist region to react with the material of the first photoresist region to form a chemical reaction layer within the first photoresist region during the baking process.

Saito further fails to anticipate the presently claimed invention, as Saito does not disclose, teach, or suggest that the chemical reaction layer and the second photoresist region are removed together during the developing process.

Accordingly, as Saito fails to disclose, teach, or suggest all of the features of amended independent claims 1 and 14, and thus of claims 3 – 13, and claims 15 and 17 – 20, dependent respectively therefrom, Saito does not anticipate the presently claimed invention.

Reconsideration and withdrawal of all rejections under 35 U.S.C. 102 are requested.

The rejections to claims 2 and 16 have been obviated by the cancellation of these claims.

Rejections under 35 U.S.C. §103(a)

In the outstanding Office Action, the Examiner further rejected claims 14 – 20 under 35 U.S.C. 103(a) as being unpatentable over Saito in view of Wheeler.

Response

Reconsideration and withdrawal of the rejections are respectfully requested.

To establish a *prima facie* case of obviousness, the Examiner must establish: (1) some suggestion or motivation to modify the references exists; (2) a reasonable expectation of success; and (3) the prior art references teach or suggest all of the claim limitations. *Amgen, Inc. v. Chugai Pharm. Co.*, 18

USPQ2d 1016, 1023 (Fed. Cir. 1991); *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970).

Applicants submit that all of the features of the presently claimed invention are not disclosed, taught or suggested in the cited prior art.

As discussed above, Saito fails to anticipate the presently claimed invention as set forth in amended independent claim 14, as Saito does not disclose, teach, or suggest (1) that a first chemical material is produced within the second photoresist region of the photoresist layer during the exposing process, (2) that a first chemical material is diffused into a first photoresist region to react with the material of the first photoresist region to form a chemical reaction layer within the first photoresist region during the baking process, or (3) that the chemical reaction layer and the second photoresist region are removed together during the developing process.

The Examiner cites Wheeler to cure deficiencies of Saito. Wheeler is drawn to a method for patterning of resist surfaces.

Wheeler fails to cure the deficiencies of Saito, as Wheeler too fails to disclose, teach, or suggest that a first chemical material is produced within the second photoresist region of the photoresist layer during the exposing process.

Wheeler further fails to cure the deficiencies of Saito, as Wheeler too fails to disclose, teach, or suggest that a first chemical material is diffused into a first photoresist region to react with the material of the first photoresist region to form a chemical reaction layer within the first photoresist region during the baking process.

Wheeler further still fails to cure the deficiencies of Saito, as Wheeler too fails to disclose, teach, or suggest that the chemical reaction layer and the second photoresist region are removed together during the developing process.

Accordingly, as the combination of Saito and Wheeler fails to disclose, teach, or suggest all of the features of amended independent claim 14, the Examiner has failed to make a *prima facie* case thereto, or with respect to claims 15 and 17 – 20 dependent therefrom.

Reconsideration and withdrawal of all rejections under 35 U.S.C. 103 are requested.

The rejection to claim 16 has been obviated by the cancellation of this claims.

CONCLUSION

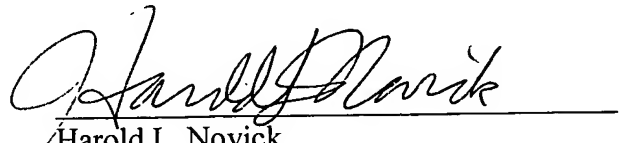
In light of the foregoing, Applicants submit that the application is now in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicants respectfully request that the Examiner contact the undersigned attorney if it is believed that such contact will expedite the prosecution of the application.

In the event this paper is not timely filed, Applicants petition for an appropriate extension of time. Please charge any fee deficiency or credit any overpayment to Deposit Account No. 14-0112.

Respectfully submitted,
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